

Capturing the hydrogen opportunity

Dr Alan Finkel – Australia's Chief Scientist

Queensland Presentations

Brisbane, 21 November 2018

The Opportunity



*Capture the hydrogen export market
and domestic benefits*

Why now?



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graph TD; A[Why now?] --> B[Production]; B --> C[Why Australia?]; C --> D[Domestic applications]; D --> E[Capturing the opportunity];
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Production

Why Australia?

Domestic applications

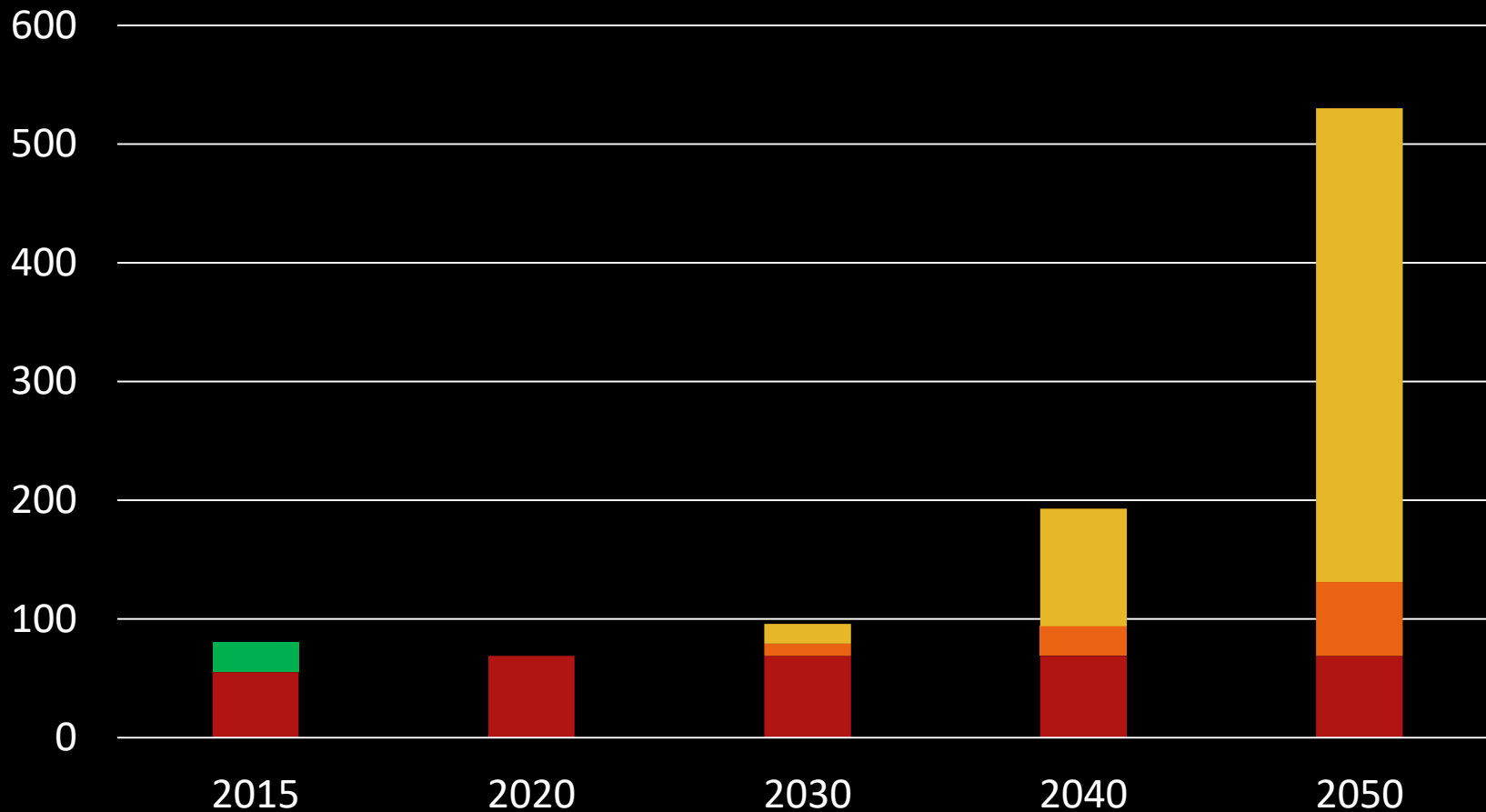
Capturing the opportunity

Why now?

Hydrogen today for chemistry...

...tomorrow for energy

Global hydrogen demand (million tonnes)



Hydrogen produced at scale for industry for decades

Yet never cost-competitive as a fuel

What has changed?

1) A firm commitment from Japan

- Export opportunity for Australia

2) Low cost production

- From renewables or fossil fuels

3) Reduced utilisation costs

- Fuel cells smaller and cheaper

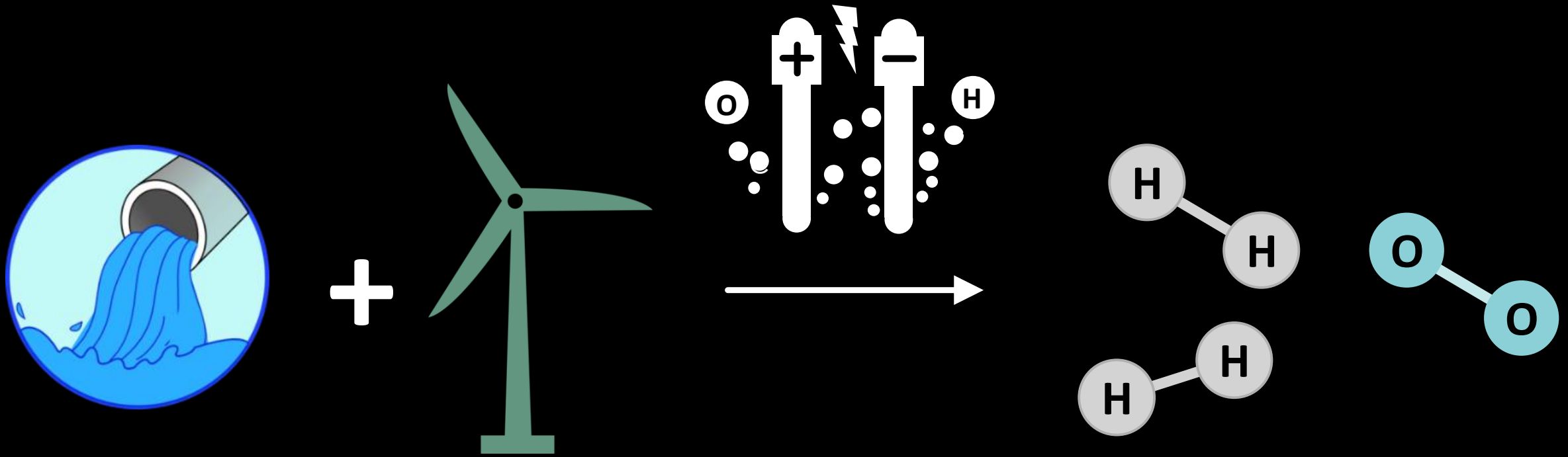


Why now?



Production

Producing **renewable** hydrogen



Record low solar power pricing (US\$/MWh)

90

80

70

60

50

40

30

20

10

(\$)

electrek

USA

USA

UAE

USA

Saudi
Arabia

Mexico

Peru

Dubai

Mexico

Dubai

UAE

Chile

UAE

Chile

Saudi
Arabia

Mexico

2013

2014

2014

2015

2015

2016

2016

2016

2016

2016

2016

2016

2016

2017

2017

2017

Shipping sunshine



- Liquefied hydrogen

- Ammonia



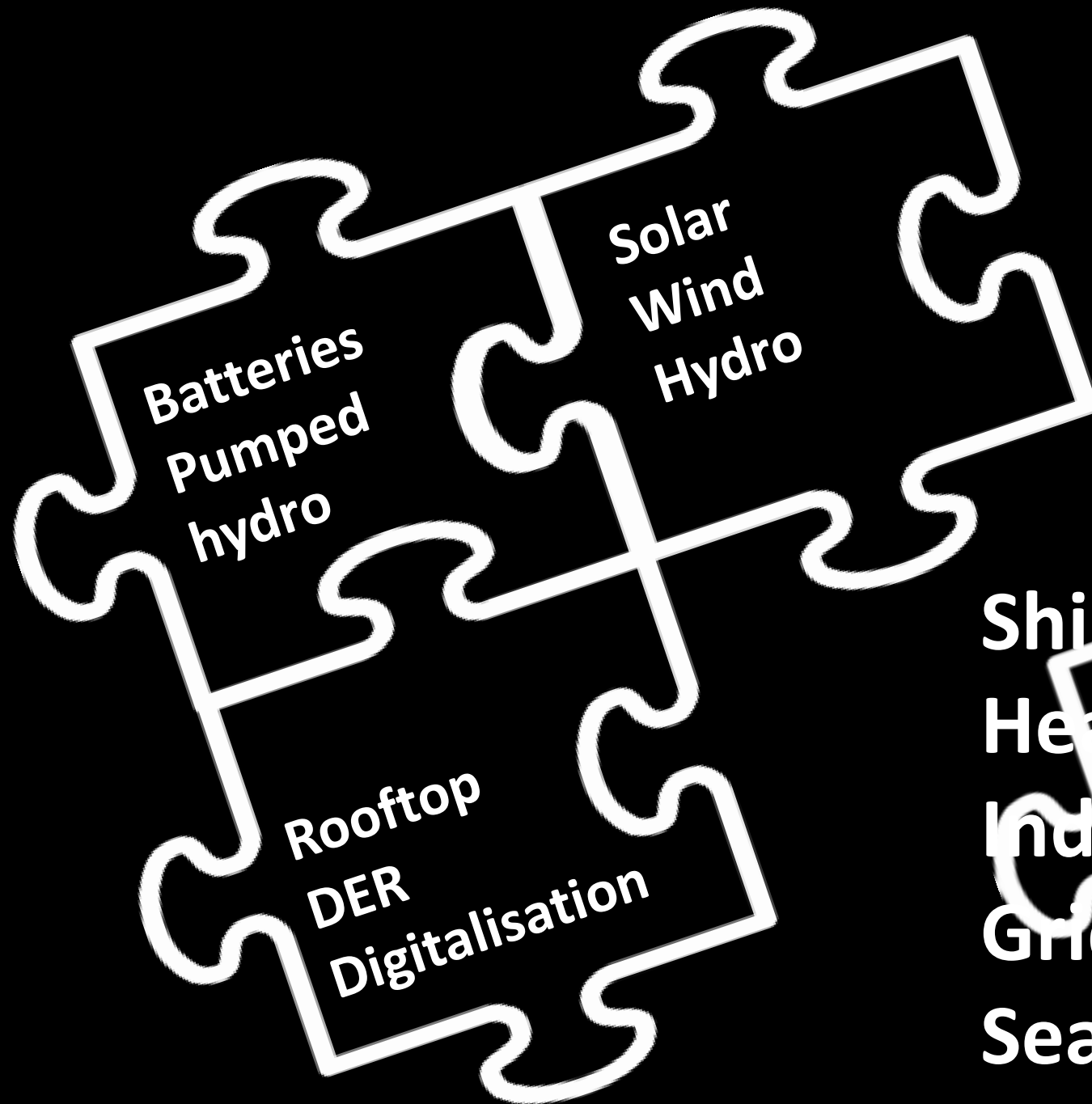
- Methylcyclohexane

Why now?

Production

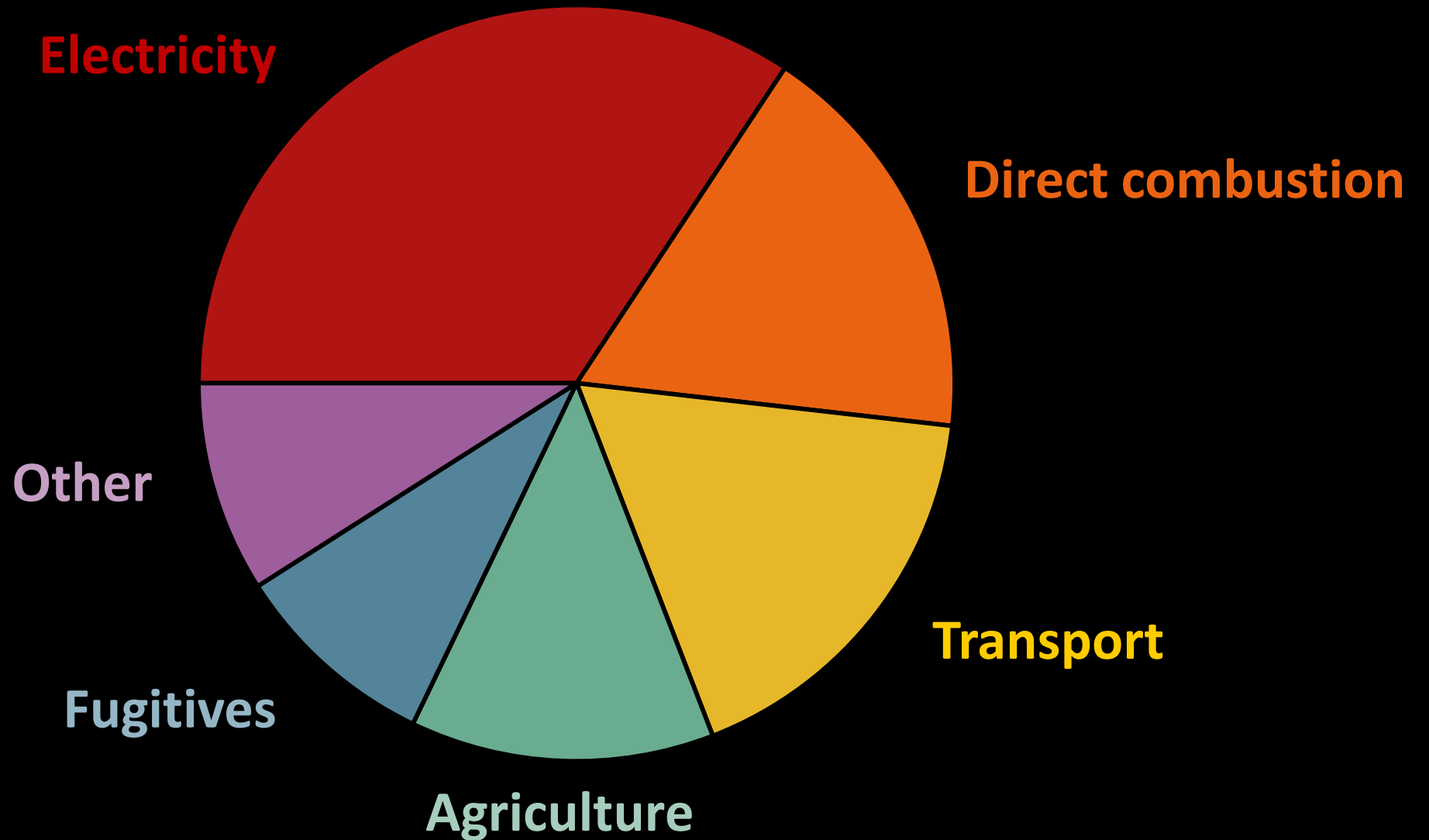
Why Australia?

Domestic applications

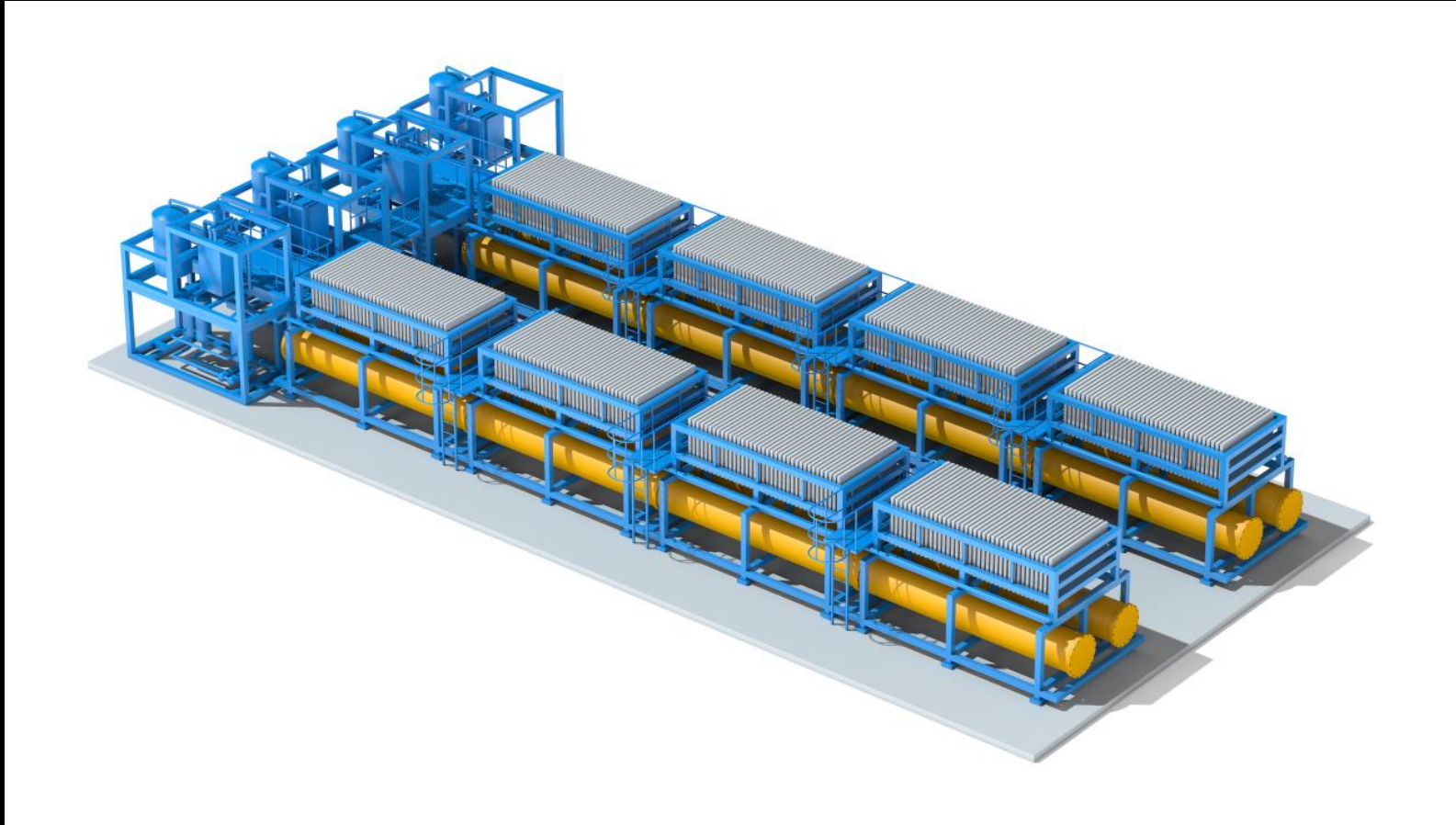


Shipping sunshine?
Heavy transport?
Industrial heating?
Grid resilience?
Seasonal storage?

Australia's emissions by sector



Electricity: electrolyzers are a fast load



Direct combustion

- Up to 10% blend – no changes





Transport





U.S. Xpress

NIKOLA ONE

H₂

H₂ ZERO EMISSION

U.S. Xpress

1-6291

8
3
1
4
6
5

53'

U.S. Xpress

LIFT POINT

LIFT POINT





September 2018 visit to Japan

Three Goals

1) Assess commitment

- Intergenerational issue
- Price is crucially important

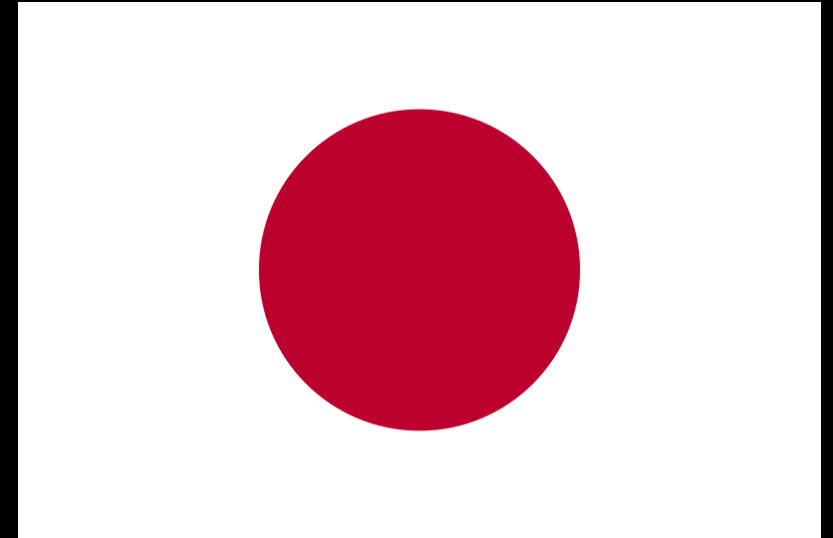
Target: US\$2/kg (US\$14/GJ)

2) Assess technological readiness

- Demonstration projects

3) Promote partnership

- Effective!



All roads lead to Rome, but the tolls are different

Production: methane, coal or electrolysis

Shipping: ammonia, cyclohexane or liquid hydrogen

Generation: hydrogen turbines or ammonia turbines

FINANCIAL TIMES

Shinzo Abe SEPTEMBER 23, 2018

“Japan will preside over the G20 next year and focus on accelerating the virtuous cycle of environmental protection and economic growth.”

“Japan has goals such as ... evolving into a hydrogen-based energy society.”

Why now?



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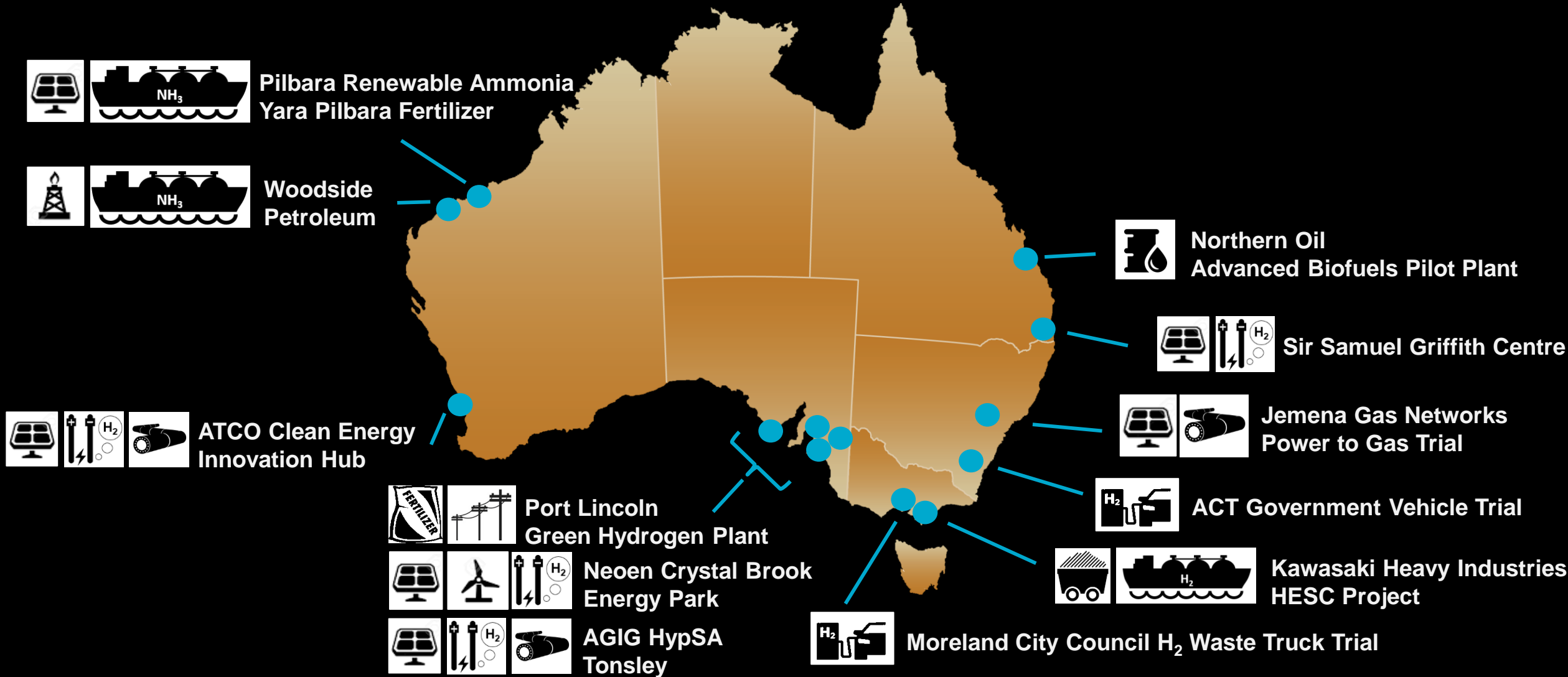
Production

Why Australia?

Domestic applications

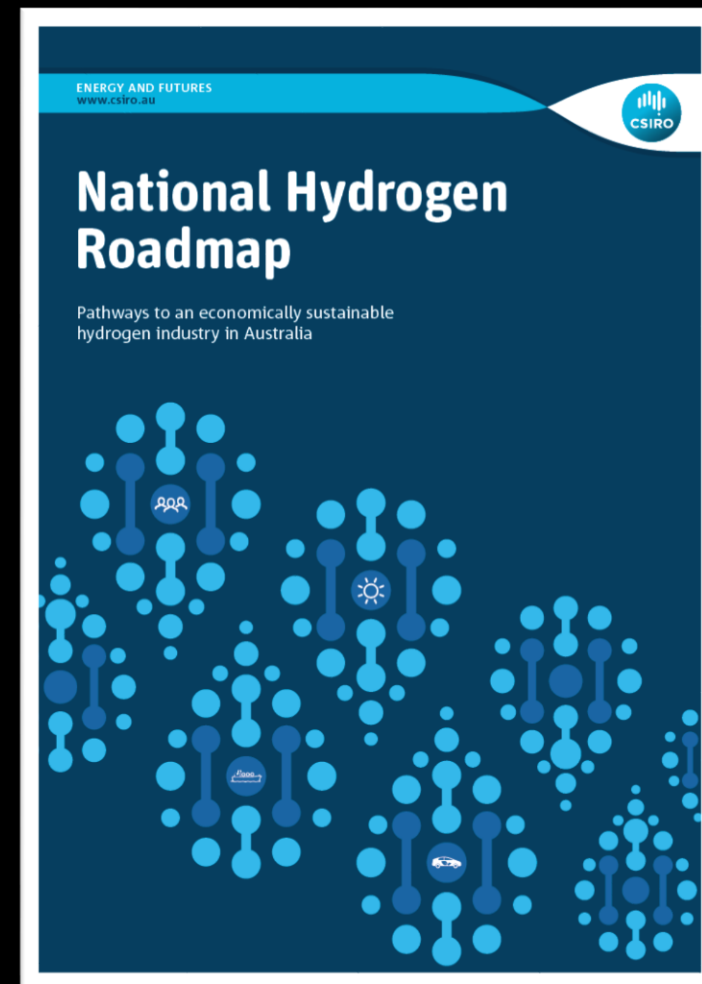
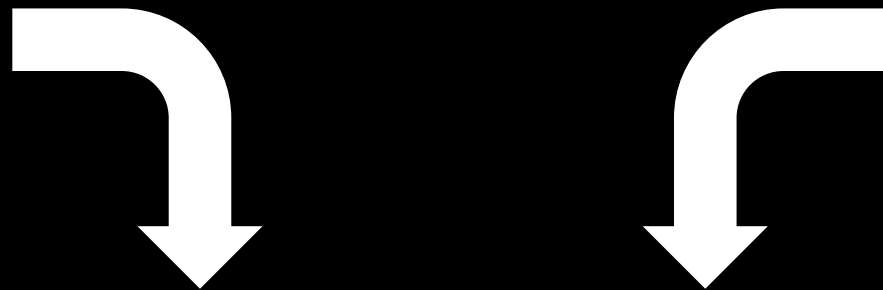
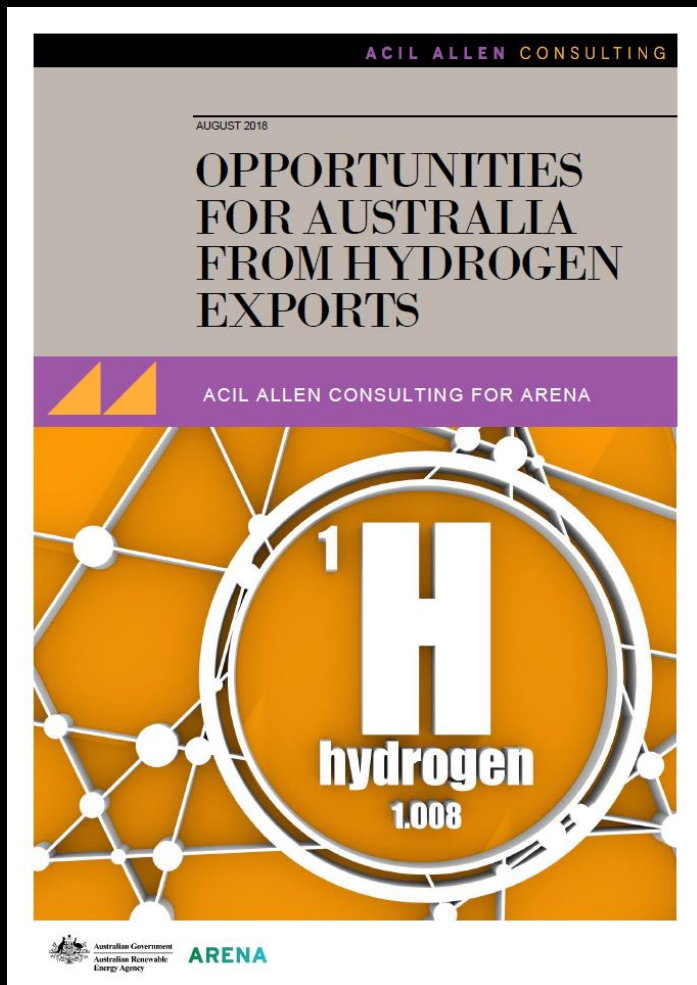
Capturing the opportunity

Activities in Australia



**CSIRO Hydrogen Future Science Platform
created early 2018**

**ARENA \$22 million funding round for
renewable hydrogen research**



National Energy Ministers meeting on 1.008 2018

The ***Chief Scientist*** will bring back a proposal for the development of a ***national hydrogen strategy*** to the December 2018 meeting.

For December 2018 meeting...

Terms
Of
Reference



Australian National Hydrogen Strategy Timeline 2019

(Subject to approval by COAG in December 2018)

January – COAG taskforce established

April – Issues paper and consultation: exports

June – Issues paper and consultation: domestic policies and measures

August – Draft national strategy considered by Ministers

September – Public consultation on draft strategy

December – National strategy presented to Ministers

Implementation 2020-2030

Energy system transition takes time

**Needs shared vision and global
partnerships**



Thank you